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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,410	11/26/2001	Makoto Kakiyama	50395-124	6868

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EXAMINER

CALEY, MICHAEL H

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 02/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/993,410	KATAYAMA ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-10 is/are rejected.
- 7) ☒ Claim(s) 3 and 4 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

Variable Optical Attenuator

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk et al. (U.S. Patent No. 6,173,105, hereinafter "Aksyuk '105").

Regarding claim 1, Aksyuk '105 discloses an optical attenuator having:

a substrate (Figure 1 element 19);

an optical circuit having a core and a cladding (Column 3 lines 23-26) divided

into two portions each having an end face;

traverses the core (Figure 4);

an optical element having an optical attenuating function, the optical element being movably disposed inside the groove at a location between the core elements (Figure 4 element 14);

an actuating means for actuating said optical element (Column 3 lines 51-57).

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Aksyuk '105 fails to disclose the core and cladding as being formed on the substrate.

Aksyuk '105, however, teaches that the disclosed invention may also be used in silica or silicon waveguides and is accordingly advantageous due to its small size (Column 5 lines 34-40). The use of Aksyuk '105's attenuator in such a teaching necessitates the use of a substrate on which to form the waveguide.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized Aksyuk '105's invention in an application requiring the use of silica or silicon waveguides and forming such waveguides onto a substrate. Such an arrangement would allow for the use of the attenuator in an integrated planar optical circuit as taught by Aksyuk '105.

Regarding claim 9, Aksyuk fails to disclose the polarization dependence loss of the optical device as equal to or less than 0.2dB regardless of the given optical attenuation amount. However, such a characteristic would have been inherent of Aksyuk's optical attenuator in order to provide the lowest possible polarization dependence loss, providing an equal loss among all wavelengths.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk '105 in view of Chai et al. (U.S. Patent No. 6,480,662, hereinafter "Chai").

Aksyuk '105 discloses all of the claimed limitations except for the light receiving surface of the optical attenuation elements as exhibiting discretely differing optical attenuation amounts. Chai teaches a design of a variable attenuator shutter element (Figure 2; Column 2 lines 29-42).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a shutter element such as taught by Chai, having discretely differing optical attenuation amounts, in the attenuator disclosed by Aksyuk '105. Such a shutter would be advantageous for reasons taught by Chai such as an easily controllable and lower cost fabrication process due to the use of a patterned opaque layer over varying the coating thickness.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk '105 in view of Aksyuk et al. (U.S. Patent No. 5,923,798, hereinafter "Aksyuk '798").

Aksyuk '105 discloses all of the proposed limitations except for the described electrode structure. Aksyuk '798, however, teaches a similar electrode structure in a switching device having a shutter.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the movement structure of the attenuator with a combed electrode structure. Such a construction would have been the most straightforward manner of assembling the device given the similar structure to the switch disclosed by Aksyuk '798.

Claim 6, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk '105 in view of Eu (U.S. Patent No. 6,222,656).

Regarding claims 6 and 10, Aksyuk '105 discloses all of the claimed limitations except for the optical attenuating function of the optical element as causing the optical element to perform an intercepting operation against the signal light. Eu, however, discloses a signal attenuator capable of performing an intercepting operation due to its slanted edge (Figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated an intercepting function into the attenuating element. Such a configuration would be advantageous to eliminate the signal completely as taught by Eu (Column 2 lines 61-65) in an application in which it is desirable to propagate 0% of the signal, such as a switch.

Regarding claim 7, Aksyuk '105 fails to disclose the shutter surface as bumpy. Aksyuk '105 discloses the shutter surface as capable of scattering incident light such that it does not reenter the emitting waveguide (Column 2 lines 14-18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the shutter surface bumpy in order to scatter the incident light. Such surfaces are old and well known in the art and would be advantageous in an application in which the shutter is configured perpendicular to the path of light.

Regarding claim 8, Aksyuk discloses an embodiment of the shutter surface as highly opaque (Column 2 lines 14-18).

Allowable Subject Matter

Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (703) 305-7913. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

mhc
February 10, 2003

